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**UTILITY PATENT
APPLICATION TRANSMITTAL**
for nonprovisional applications under 37 CFR 1.53(b)

Attorney Docket No: 2068.001

FIRST NAMED INVENTOR OR APPLICATION IDENTIFIER
Inventor: William L. Palmer; Stephen R. Palmer
Title: INTERACTIVE FOODSTUFF HOLDING DEVICE
EXPRESS MAIL LABEL NO.: EL312873065US

Date submitted: 08/19/99

(See MPEP chapter 600 concerning utility patent appln.)

APPLICATION ELEMENTS
Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

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1. ☒ Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)
2. ☒ Specification 36 Total Pages
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R&D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 USC 13) 14 New Sheets
4. ☒ Decl./Pow. of Att. 3 Total pages
 - a. ☐ Combined Executed (original or copy) for C-I-P application
 - b. ☐ Copy from a prior appln. (37 CFR 1.63(d)) (for continuation/divisional with Box 17 completed)
5. ☐ Incorporation By Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the Oath or Declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. Microfiche Computer Program (Appendix)
7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (Identical to computer copy)
 - c. ☐ Statement verifying identity of above copies
8. ☐ Assignment Papers (cover sheet & documents(s))
9. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure ☒ Copies of IDS
Statement (IDS)/PTO-1449 Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503)
14. ☒ Small Entity(2) ☐ Statement filed in prior Application
15. ☐ Certified Copy of Priority Document(s)
(If foreign priority is claimed)
16. ☐ Other: _____

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____

18. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label or ☒ Correspondence address below
(Insert Customer No. Or Attach bar code label here) Cust. #21917

NAME: Michael A. Slavin
McHale & Slavin, P.A.
ADDRESS: 4440 PGA Blvd.,
Suite 402
CITY: Palm Beach Gardens STATE: FL ZIP CODE: 33410
COUNTRY: U.S.A. TELEPHONE: (561) 625-6575 FAX: (561) 625-6572

SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

CERTIFICATE OF EXPRESS MAIL

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I HEREBY CERTIFY that the following correspondence: **UTILITY PATENT APPLICATION PAPERS; including UTILITY APPLN. TRANSMITTAL; FEE CALCULATION SHEET; Specification, claims and 14 sheets of drawings; DECLARATION/POWER OF ATTY.; VERIFIED STATEMENT - SMALL BUSINESS CONCERN; INFORMATION DISCLOSURE STATEMENT; ASSIGNMENT and Assignment cover transmittal; IDS FORM: 1449 w/references; check no. 2476 in the amount of \$420.00 for filing fee and Assignment recordation fee; Express Mail Mailing Certificate, and return-receipt postcard;** regarding the Application entitled: INTERACTIVE FOODSTUFF HOLDING DEVICE is being deposited with the United States Postal Service as EXPRESS MAIL, POST OFFICE TO ADDRESSEE, in an envelope addressed to:

Commissioner of Patents & Trademarks
Box Patent Application
Washington DC 20231

on August 19, 1999

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code.

MCHALE & SLAVIN, P.A.
4440 PGA BLVD. SUITE 402
PALM BEACH GARDENS, FL 33410
(561) 625-6575


Cathy Nicholson
Legal Assistant

STATEMENT CLAIMING SMALL ENTITY STATUS Docket Number: 2068.001

(37 CFR 1.9(f) & 1.27(c)) - SMALL BUSINESS CONCERN

Applicant, Patentee, or Identifier: William R. Palmer and Stephen L. Palmer

Application or Patent No.: _____

Filed or Issued: _____

Title: INTERACTIVE FOODSTUFF HOLDING DEVICE

I hereby state that I am

_____ the owner of the small business concern identified below:

☒ an official of the small business concern empowered to act on behalf of the concern identified below:NAME OF SMALL BUSINESS CONCERN Sierra Innotek, Inc.ADDRESS OF SMALL BUSINESS CONCERN 4391 Cameron Rd., Cameron Park, CA 95682

I hereby state that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office, in the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

_____ the specification filed herewith with title as listed above.

☒ the application identified above.

_____ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern, or organization having rights to the invention must file separate statements as to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization having rights in the invention is listed below:

☒ No such person, concern, or organization exists.

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Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

NAME OF PERSON SIGNING William R. PalmerTITLE IN ORGANIZATION OF PERSON SIGNING Vice-PresidentADDRESS OF PERSON SIGNING 4391 Cameron Rd., Cameron Park, CA 95682SIGNATURE William R. Palmer DATE 08/18/99

INTERACTIVE FOODSTUFF HOLDING DEVICE

Field of the Invention

This invention is directed to children's toys and, in particular, to an interactive foodstuff holding device that produces actions based upon real-time physical characteristics of a secured foodstuff item.

Background of the Invention

A great number of novel food items and in particular, candies are known. Recently, several devices have been created which incorporate a sound, light or motion generating means with a candy product. Some of these devices are simply electric motor systems which spin a lollipop in the user's mouth. Others, use the inherent light transmitting properties of some candies to create an illuminated, edible element. Light sources used have included electric lamps and chemiluminescent lighting elements. Still other novel food items include battery powered, motor operated dispensers or candy holders with electronic sound generating means which produce music or a rhythmic sound when a conventional, manual electric switch is operated. U.S. Patent Nos. 4,383,386; 5,209,692; 5,391,107; and 5,471,373 disclose examples of these devices.

1 Summary of the Invention

2 The instant invention teaches of a new and highly
3 interesting system which can be used with a wide variety of
4 foodstuffs (both nutritive and non-nutritive) and which relies
5 on controlling, optical, electrical or other physical
6 conditions which may be operatively coupled with the foodstuff
7 to control an action generating means. Such action may include
8 but is not limited to any of the following activities: sound
9 generation; lighting generation; and motion generation, such as
10 rotation, translation or vibration.

11 Thus it is an objective of the instant invention to
12 provide an interactive foodstuff holding device that produces
13 action based upon real-time interaction with physical
14 characteristics of a secured foodstuff item.

15 Other objects and advantages of this invention will become
16 apparent from the following description taken in conjunction
17 with the accompanying drawings wherein are set forth, by way of
18 illustration and example, certain embodiments of this
19 invention. The drawings constitute a part of this
20 specification and include exemplary embodiments of the instant
21 invention and illustrate various objects and features thereof.

22
23 Brief Description of the Drawing

Figure 1 illustrates the operation and shows electrical current path of one embodiment of the instant invention;

Figure 2 is a detail drawing of one embodiment of the instant invention;

Figures 3-6 illustrate some possible configurations of sound control using one embodiment of the instant invention;

Figure 7 details an electrically conductive, edible figure and foodstuff holder;

Figure 8 illustrates the use of foodstuffs of differing conductivities to create a non-linear electrical circuit;

Figure 9 illustrates the use of foodstuffs of differing conductivities to create a potentiometer;

Figure 10 shows how a "harmonica" may be constructed with electrically conductive foodstuffs;

Figure 11 illustrates the concept of using individual edible elements to trigger discrete action means;

Figure 12 shows how conductive foodstuffs with an irregular surface may be used to create a rapid make-and-break signal;

Figure 13 details the design of a foodstuff holder in which the musical pitch of an oscillator is determined by controlling light levels;

Figure 14 is a schematic diagram of a light controlled oscillator;

Figure 15 is a schematic diagram of a light controlled oscillator which frequency may be manually adjusted;

Figure 16 is a schematic diagram of a light controlled oscillator which frequency is a step function of the light input level and is adjusted to a Western musical scale; and

Table 1 shows measured resistance values for selected edible foodstuffs.

Detailed Description of the Preferred Embodiment

It is to be understood that while a certain form of the invention is illustrated, it is not to be limited to the specific form or arrangement of parts herein described and shown. It will be apparent to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

Now with general reference to the drawings and, in particular to Figure 1, the variable output foodstuff holding toy device 100 of the present invention is shown. Action within the holder 100 is triggered and/or controlled by a

1 portion of the user's body 102,104 that comes in contact with
2 or in close proximity to the edible foodstuff 101 by the user's
3 tongue, mouth, body or other object.

4 It is noted that the terms "resistance" and "conductivity"
5 as applied to electrical circuits are understood to be
6 reciprocal values of one another but for the purposes of this
7 text will be used interchangeably since changes either in
8 resistance or conductivity will produce the desired effects of
9 the instant invention.

10 In one embodiment, an electrical circuit 103 is
11 constructed, in which a minute electric current passes from an
12 electrically conductive foodstuff 101 through a holder 100, to
13 the user's hand and arm 104 and up to the user's mouth or
14 tongue 102, whereby the circuit is completed when the mouth,
15 tongue or other body member comes in contact with the
16 foodstuff. A voltage controlled oscillator, or otherwise
17 operable sound or action generating means 132 is employed in
18 holder 100. Holder 100 also serves to support edible foodstuff
19 101. Holder 100 may be at least partially electrically
20 conductive or have a label 105 which is at least partially
21 conductive to aid in completing electric circuit path 103 from
22 holder 100 to user's hand and arm 104. When edible foodstuff
23 101 is touched to tongue 102, the electric circuit path 103 is

1 completed and any desired action generating means 132 may be
2 triggered.

3 Referring now to Figure 2, one embodiment of the instant
4 invention comprises of holder 100 with label 105 and edible
5 foodstuff 101. A protective cover 106 may be employed to
6 protect edible foodstuff 101 during shipping and periods of
7 disuse.

8 The holder 100 may also be constructed to provide the same
9 operational features while being controlled by variations in
10 the electrical capacitance created by the position of the food
11 stuff 101 in relation to the holder 100 and the user's mouth or
12 other body member 102,104. This version of the instant
13 invention does not require that the foodstuff 101 be conductive
14 but instead that it exhibit dielectric properties so that a
15 capacitive element may be formed between the user's mouth or
16 tongue 102, for example, and the foodstuff holder 100.
17 Voltages and currents are necessarily kept low to prevent
18 injury or even the perception of injury to the user. Indeed,
19 circuits developed for the instant invention rely on currents
20 in the range of 100 nano-amps which are undetectable to the
21 user. A circuit in which changes in capacitance are employed
22 to control action generating means 132 may be of the direct
23 current, alternating current or radio frequency type.

1 The preferred embodiment of the instant invention relies
2 on controlling the level of light which may be transmitted
3 through or proximal to a portion of a lollipop 301. A photo
4 sensor 308 and electronics 304, convert said light level to an
5 action such as the generation of a musical note. The level of
6 light passing through or proximal to the foodstuff may be
7 controlled by the relative position of the foodstuff to the
8 user's mouth or tongue 102, hand or other body element 104, or
9 object, thereby resulting in action of the device 300 which is
10 responsive to the motion or position of the user.

11 Yet another means of achieving the desired interactive
12 relationship between the user and the device of the instant
13 invention is to employ electromagnetic fields and/or radio
14 waves. Said fields or waves being interrupted, absorbed,
15 reflected or otherwise altered by the position of the user or
16 user's extremities or other objects relative to the instant
17 invention.

18 The device output may be altered in response to variations
19 within the included electrically conductive path 103. When
20 current and/or capacitance in the heretofore described circuit
21 103 exceeds a predetermined threshold, an electronic circuit is

energized or otherwise controlled which may produce any combination of the following effects:

1. A single audio frequency tone is generated as long as the electric circuit path 103 is completed (contact of edible foodstuff 101 with tongue or mouth 102 while holding holder 100 in one's hand 104 completes the circuit.) Figure 3 is a block diagram showing how a tone generator or tone sequence generator 132 may be triggered by completing the electrical circuit between the sense terminals. In this case the sense terminals are the user's tongue 102 and edible foodstuff 101.

2. An audio frequency tone which frequency is proportional to current or capacitance in the circuit is generated. Changing contact position of the tongue 102 relative to the edible foodstuff 101 for example, causes the audio frequency to change proportionately. Figure 4 is a block diagram which illustrates how a changing ohmic value when presented to the sense terminals may be used to control the musical pitch or frequency of a voltage controlled oscillator 132. Once again, sense terminals are the user's tongue 102 and edible foodstuff 101 whereby the varying ohmic value is controlled by tongue or mouth pressure, degree of contact to

edible foodstuff 101 and other means as described elsewhere in this text.

3. An audio frequency tone which volume is proportional to the current or capacitance in the circuit is generated.

4. A series of audio frequency tones or notes is generated in response to contact of the edible foodstuff by the tongue, mouth or other body member. A song, rhythm or other musical piece could be produced by the device whereby this action is initiated for example by contact of the user's tongue to the foodstuff.

5. A prerecorded sound is replayed in response to contact of the edible foodstuff by a body member. This prerecorded sound may be permanently stored in a memory device which is programmed during device manufacture. Figure 5 is a block diagram which shows how a sound generator with prerecorded audio may be triggered and or controlled by the ohmic value presented to the sense terminals. Again, sense terminals are the user's tongue 102 and edible foodstuff 101. Alternately, the sound to be generated may be recorded by the user at some time prior to playback. For example, a personal

1 message could be recorded in such a device by an individual
2 with the intent that it be replayed by another individual.
3 Figure 6 is a block diagram of an audio record and playback
4 means whereby at least the playback is triggered and or
5 controlled by presenting an ohmic value to the sense terminals
6 as previously described.

7 A particularly interesting device would be one which
8 employed a prerecorded animal sound which correlated with the
9 shape and design of the foodstuff. For example, a piece of
10 taffy in the shape of a frog could emit a loud "ribbet" when
11 licked or otherwise contacted. Likewise, a "space alien" could
12 emit a cry when its head, arms or other extremities were bitten
13 off. Figure 7 shows how an electrically conductive edible
14 figure 107 may be coupled to holder 100 in one embodiment of
15 the instant invention.

16 Young boys seem particularly attracted to rather grotesque
17 themes such as the aforementioned. Indeed, each extremity of
18 the creature could have a unique resistance value or contact
19 connection and hence a unique sound associated with it. A game
20 such as "hangman" could be played whereby portions of the
21 creature are successively eaten until the creature is
22 completely consumed. The user's actions may be prompted by
23 sounds produced by the instant invention.

1 A fire engine siren sound could be generated each time the
2 user's tongue touched a piece of "hot" cinnamon candy. Devices
3 holding candy containing sour tasting ingredients such as malic
4 acid might produce a "yecchh!" sound each time the candy
5 element was contacted to the user's tongue.

6
7 6. A game sequence which may take, for example, the form
8 of user input consisting of multiple and or repeated tongue
9 contact with the foodstuff in response to sounds and or lights
10 emitted from the electronic circuit. One version of such a
11 game is commonly known as "memory." In this game the
12 electronic circuit emits a series of notes or tones. The user
13 must thereafter repeat this series of notes or tones. Proper
14 repetition of the notes or tones is rewarded when the device
15 repeats and then adds to the series, thereby presenting a new
16 challenge to the user. Improper repetition is announced by an
17 unpleasant tone often referred to as a "raspberry." LED's or
18 or other lighting means could be employed to provide feedback
19 to the user in conjunction with or apart from sounds generated
20 by the device.

21 Another game which could be employed would be a teaching
22 game whereby the device emits tones or beeps or flashes of
23 light corresponding to numerical values and a mathematical

operator. The user then must respond by providing the proper solution to the mathematical problem. A reward and punishment scheme similar to that described above could also be used with this type of game with the reward being, for example, a brief musical tune. The user could select predetermined operators if desired to eliminate the need for the device to produce them. In such a scheme if an "addition" operator was chosen, the following sequence might occur:

Device: "beep-beep" "beep-beep" (what is $2 + 2$?)

User: Lick, Lick, Lick, Lick (4)

Device: (plays a musical tune and presents a new problem to be solved)

Pre-selection of the mathematical operator or, indeed, the nature of the game to be played could be selected by user input in the form of a series of contacts with the foodstuff or by means of a conventional, manually operated switch(s). A small microcontroller driving a speaker could perform the functions discussed above with the single user input being tongue contact to the conductive foodstuff. The rate of tongue contact, the position of tongue contact on the foodstuff, force with which the tongue contacts the foodstuff or surface area contacted, or a combination of these could serve to provide feedback to the microcontroller and hence, user inputs to the game.

1 7. Another version of the device, as shown in Figure 6,
2 employs a microphone 132' to monitor sounds and/or vibration
3 transmitted through the foodstuff when licked, bitten or
4 chewed. This sound is amplified and played through a
5 loudspeaker. A system with this feature would provide
6 amusement each time the foodstuff was licked, bitten or chewed.
7 The microphone 132' and loudspeaker 132 could be combined in
8 one device with a switching means to first record and then
9 alternately playback sounds. Sounds produced may include a
10 loud or exaggerated licking or slurping noise which may include
11 playback of the recorded sound with deliberate distortion
12 and/or amplification.

13
14 It is understood that variations in the electrical
15 resistance of the current path particular to the food stuff may
16 be due to any combination of the following:

- 17 1. Specific conductivity of the foodstuff;
- 18 2. Moisture present in the foodstuff or on the surface
19 of the foodstuff;
- 20 3. Tongue, mouth, or other body member contact point
21 location on the foodstuff, relative to the current path;

1 4. Surface area contacted by the body member either on
2 the edible foodstuff and/or the at least partially conductive
3 holder;

4 5. Force of contact between the edible foodstuff and the
5 body member and/or force of contact between the at least
6 partially conductive holder and a body member;

7 6. Alterations in the geometry of the edible foodstuff
8 such as stretching or compressing the foodstuff so that the
9 conductive cross section of the current path is altered or, by
10 changes in the foodstuff geometry by removing portions of the
11 foodstuff through such actions as biting and/or tearing with
12 the teeth or fingers; and

13 7. Alterations in the geometry of the edible foodstuff
14 such as stretching or compressing the foodstuff so that the
15 conductivity of the foodstuff is altered by compression or
16 expansion of the foodstuff or otherwise changing its structure.

17 Similarly, versions of this device which are controlled by
18 variations in electrical capacitance rather than resistance may
19 employ any of the well known means of changing the effective
20 capacitance of the circuit to produce the same effects. Such
21 means include varying one or more of the following parameters:

22 dielectric constant, surface area, distance between
23 conductive elements.

1 Foodstuffs anticipated for use with the device include,
2 but are not limited to the following:

3 Taffy, chewing gum, licorice, fudge, cotton candy,
4 marshmallow, caramel, "gummy candies" (gelatin based
5 candies such as "Gummy Bears" manufactured by
6 Heide, Henry, Inc. New Brunswick, NJ), hard candies
7 (which may contain various sugars and/or corn
8 syrup), fondants, breads, cakes, cookies, crackers,
9 cheeses, vegetables (such as carrots and the like),
10 fruits, jerked meats, or frozen confections such as
11 ice cream and juice bars.

12
13 Incorporation into the foodstuff of air or other
14 relatively poor electrical conductors may be employed to reduce
15 and/or control the electrical conductivity or dielectric
16 constant of the foodstuff. Likewise, water or ionizing agents
17 may be dispersed or dissolved into the foodstuff to alter the
18 electrical conductivity or dielectric constant of the
19 foodstuff.

20 A listing of measured resistance values for various
21 confectionery items is shown in Table 1.

22 The electrical property of the foodstuff used to trigger
23 and/or control the action generating means need not be

1 uniaxially constant or even constant in the same axis with
2 respect to location along that axis. For example, a
3 combination of differing types of foodstuffs may be combined by
4 layering, partial kneading, folding, or extrusion which
5 produces a mass which has differing electrical properties
6 depending on the orientation of current flow or electrostatic
7 potential.

8 Figure 8 shows how nonhomogeneous foodstuffs 108, that is
9 foodstuffs with differing electrical properties, may be
10 combined to create circuits which exhibit a non-linear
11 conductivity function with respect to point of contact. Such
12 nonhomogeneous foodstuffs 108 could exhibit a non-linear change
13 in either electrical conductivity or electrical capacitance
14 with a linear change in point of contact. Indeed, foodstuffs
15 120,130 exhibiting differing electrical properties could be
16 suspended in one another. For example, spheroids of highly
17 conductive candy may be suspended in a candy of relatively
18 lower conductivity. When a user contacts the more highly
19 conductive portions of the candy matrix a non-linear change in
20 resistance with respect to the position of the user's tongue on
21 the candy will be realized.

22 Figure 9 illustrates how for example, a more conductive
23 foodstuff element 120 could be alternately stacked with a less

1 conductive foodstuff element 130. This would yield a
2 "potentiometer" which could generate a resistance "step"
3 function with respect to linear changes in the contact point of
4 current flow. If a voltage controlled oscillator 132 (VCO) was
5 connected to a power source 134 placed in series with this
6 stack of foodstuffs (candy, for example) an "electronic
7 harmonica" is created whereby relative position of the user's
8 tongue causes discrete, predetermined notes to be played. When
9 coupled with the holder base 100 described above whereby
10 portions of the user's body 102,104 become part of the
11 electrical circuit, a practical, edible, electronic musical
12 instrument is created.

13 A further variation on the instant invention includes a
14 foodstuff 101 which may be combined with an electronic circuit
15 103 to product the effects described previously whereby only a
16 very small portion of the user's body becomes part of the
17 circuit. For example, the harmonica 200 in Figure 10 may
18 present two adjacent contacts to the user's tongue or lips 102.
19 When the circuit between these two contacts is completed via
20 the user's tongue or lips, a musical note is produced. Several
21 sets of contacts may be employed in like fashion to produce a
22 harmonic scale of musical notes. A first edible foodstuff
23 array 201 and a second edible foodstuff array 202 may be

1 positioned relative to each other so that when corresponding
2 elements of these arrays are connected via contact with the
3 user's mouth or tongue 102, a note specific to these elements
4 is generated. In a device such as a harmonica 200, the holder
5 100 need not necessarily be electrically conductive.

6 A still further variation of this device utilizes a
7 plurality of edible elements 110 connected to various sites on
8 the holder in such a fashion that they do not communicate
9 electrically with one another. Each holder site produces a
10 different response when its circuit is completed. For example,
11 Figure 11 shows how eight isolated foodstuff elements 110 may
12 be positioned, each in contact with one of eight electrical
13 inputs which are connected to an electrical sound generation
14 device 132. Touching each element 110 produces a unique sound
15 or action regardless of how or where the candy piece is
16 touched. Such a system is included in the scope of the instant
17 invention.

18 Additionally, a single piece of candy 101 may be connected
19 to a single electrical contact with various sound selections
20 being made by finger contact on a plurality of electrically
21 conductive regions (or push button switches) on the holder 100.
22 Sound generation would not commence until the user's tongue 102
23 contacted the single piece of candy, thereby completing the

1 circuit. Musical note selection would be similar to that of a
2 flute whereby fingering position selects the note to be played
3 and contact with the tongue or mouth 102 serves to switch on
4 the note.

5 Another variation of the device would have the foodstuff
6 111 take the form, for example, of a solid of revolution
7 resembling a high voltage electrical insulator. Irregularly
8 surfaced foodstuff element 111, as illustrated in Figure 12,
9 would permit the user to run his tongue 102 across the surface
10 of the foodstuff thereby making and breaking contact with the
11 foodstuff. This would permit a rapid succession of changing
12 electrical inputs to be created by the user which could produce
13 unusual and interesting sound and/or lighting effects. A
14 similar input means could be created by twisting or otherwise
15 forming together (as when producing a striped candy cane) a
16 plurality of foodstuffs 120,130 with differing electrical
17 properties.

18 Again referring to Figure 13, the device output may also
19 be altered in response to variable optical input. An alternate
20 embodiment of the instant invention uses varying levels of
21 light which may be transmitted through the foodstuff or
22 proximal to the foodstuff to a light controlled oscillator or
23 other electronic system. With a light controlled oscillator

1 for example, the user may control the pitch of the oscillator
2 by the relative position of the foodstuff to the mouth. A
3 musical tune may even be played by carefully controlling
4 relative position of the mouth and the foodstuff. The source
5 of light for this device may be derived from natural ambient
6 light or may come from an artificial source such as a room lamp
7 or even from a light source which is integral to the foodstuff
8 holder. Said light source may consist of visible light,
9 invisible(e.g. infrared or electromagnetic) light, or a
10 combination of visible and invisible light. Any of the
11 previously mentioned effects or games may be triggered and or
12 controlled by this optical means.

13
14 It is understood that variations in the level of light
15 reaching the photo sensor may be due to any combination of the
16 following situations:

17 1. Light transmittance at a given wavelength of the
18 lollipop 301;

19 2. Inclusion of entrained air bubbles, particles or
20 other objects which may contribute to a nonhomogeneous nature
21 of the lollipop 301;

22 3. Contact point location on the foodstuff 301, for
23 example, tongue or mouth 102 position on the foodstuff and

1 hence blockage of some or all of the light otherwise received
2 by the photo sensor or alternately, degree of obscuration of
3 light reaching the photo sensor due at least in part to the
4 degree of coverage of the foodstuff or photo sensor proximal to
5 the foodstuff by the user's mouth, tongue or other body part or
6 other object;

7 4. Portion of lollipop 301 shielded from light by user's
8 mouth or tongue 102, other body part 104, or other object;

9 5. Level of light available to which the foodstuff 301
10 is exposed;

11 6. Alterations in the geometry of the edible foodstuff
12 such as stretching or compressing the foodstuff 301 so that its
13 optical transmission properties are altered or by changes in
14 the foodstuff geometry through removal of portions of the
15 foodstuff by such actions as biting and/or tearing with the
16 teeth or fingers; and

17 7. Alterations in the geometry of the edible foodstuff
18 such as stretching or compressing the foodstuff so that the
19 optical properties of the foodstuff are altered by compression
20 or expansion of the foodstuff or otherwise changing its
21 structure.

22 In the preferred embodiment of the present invention,
23 shown in Figure 13, the means of control relies on varying

1 levels of light through or proximal to a candy element. A
2 candy holder with optical control 300 holds a lollipop 301.
3 Lollipop stick 302 may be gripped or otherwise held by stick
4 receiver 303. Stick receiver 303 may optionally be in the form
5 of a tube designed in such a manner so as to receive lollipop
6 sticks of varying diameters and lengths. Stick receiver 303
7 may be designed with a slight curve so that an interference fit
8 is created between the sides of stick receiver 303 and lollipop
9 stick 302. Included electronics 304 comprises sound, light or
10 other action generating means as may be desired. The
11 embodiment of the instant invention as illustrated in Figure 13
12 employs a solid state electronic oscillator to create sound.
13 The included electronics 304 are powered by battery 305.
14 Electrical output from the electronics 304 is electrically
15 connected to loudspeaker 306. A push button switch 307 turns
16 the device on and off as desired. The electronic oscillator is
17 of a variable frequency type which frequency is controlled by
18 photo sensor 308. Photo sensor 308 is exposed to varying
19 levels of light through optical window 309 which is in optical
20 communication with optical passage 311. Optical window 309
21 serves not only to permit the passage of light but also to
22 prevent spittle from contacting photo sensor 308 or from
23 entering housing 312. A light shield 310 prevents stray light

1 from reaching photo sensor 308 and thereby interfering with the
2 desirable control of the device. Light shield 310 is
3 preferably opaque to light so as to minimize this stray light.
4 Any significant levels of light then must necessarily pass
5 through the candy element of lollipop 301 and then through
6 optical passage 311 and optical window 309 before reaching
7 photo sensor 308. It is assumed that stray light must also be
8 prevented from entering optical window 309 or photo sensor 308
9 from the sides or those faces which are not oriented toward
10 lollipop 301. This may conveniently be achieved by making
11 housing 312 of an opaque or nearly opaque material and insuring
12 that any joints or seams are tight. Overlapping "lips" such as
13 are common in the construction of mating halves of injection
14 molded plastic housings can achieve this light tightness.
15 Optionally, stick receiver 303 may be extended out through the
16 bottom of housing 312 so that in the event that lollipop stick
17 302 becomes stuck in stick receiver 303 such as in the event
18 that all of the lollipop 301 has been consumed, that an item
19 similar to lollipop stick 302 may be used to push lollipop
20 stick 302 out of stick receiver 303 so that the device may be
21 reused with a new candy element. Any manner of candy element
22 may be used with this embodiment of the instant invention so
23 long as the candy element will permit light to pass through it

1 and to photo sensor 308. Alternately an opaque candy element
2 may be used when, photo sensor 308 is positioned in such a
3 fashion that it is proximal to the candy element and situated
4 in such a manner so that it is exposed to levels of light
5 proximal to the candy element. In this arrangement the levels
6 of light reaching photo sensor 308 are more or less congruent
7 with those to which the candy element is exposed and more
8 importantly, those levels of light which vary in proportion to
9 the position of the user's mouth or tongue relative to photo
10 sensor 308 as user's tongue or mouth acts upon the candy
11 element thereby creating the desired effect of control of the
12 action generating means by the relative position of one's
13 mouth, tongue, or other body member to the candy element.

14 The candy holder with optical control 300 then, functions
15 in the following manner:

16 Light passes through lollipop 301 and through optical
17 passage 311 and further through optical window 309. Said light
18 then reaches photo sensor 308 (which may be of the cadmium
19 sulfide type) whereby it affects the ohmic value of photo
20 sensor 308. Photo sensor 308 is operatively coupled to a
21 variable frequency audio oscillator circuit which frequency is
22 controlled by the ohmic value of photo sensor 308 and therefore
23 is responsive to the level of light falling on photo sensor

1 308. One such possible circuit is illustrated in Figure 14.
2 The electrical output of the variable frequency oscillator is
3 connected to loudspeaker 306 whereupon the electrical signal
4 is converted to sound. The variable frequency oscillator may
5 be designed such that a decrease in light falling on photo
6 sensor 308 causes a corresponding decrease in the audio
7 frequency or musical pitch of the oscillator. Since the
8 frequency of the oscillator is proportional to the level of
9 ambient light passing through lollipop 301 and since this level
10 of light may be more or less controlled by the degree with
11 which one's mouth covers lollipop 301 it is evident that the
12 musical pitch produced by candy holder with optical control 300
13 may be controlled by one's mouth in such a manner that musical
14 notes and indeed, even songs may be played. Duration of sound
15 output is controlled by holding down push button switch 307.
16 It is relatively easy to play simple tunes on the instant
17 invention and with a bit of practice even rather involved
18 musical pieces may be performed.

19 Figures 14, 15, and 16 illustrate circuits which may be
20 employed to control the generation of sound by means of varying
21 the light level transmitted through or proximal to an edible
22 foodstuff. These circuits are illustrative only and it is

1 understood that it is within the scope of this invention to
2 include other specific means to achieve the desired effects.

3 Yet another embodiment of this invention includes means
4 for providing an "electrical sensation" to the user's tongue,
5 mouth or other body member from the device by means of
6 producing a mild electrical shock which may be transmitted
7 through the foodstuff. The electrical stimulation may also be
8 used to alter sense of taste and thereby, the apparent flavor
9 of the foodstuff.

10 In situations where the properties of the foodstuff make
11 it difficult or impractical to rely on the electrical
12 resistance, capacitance or optical properties of the foodstuff
13 for action controlling means, a small switch or transducer 136
14 may be situated in the holder which is operatively coupled with
15 the foodstuff and is responsive to forces applied to it by the
16 foodstuff. This transducer may be a simple on-off switch or
17 take the form of a "joystick" with a plurality of variable
18 outputs.

19 Any of the above mentioned devices that create a response
20 to user input could be equipped with a means to disable said
21 response as may be desired.

22 Since in many cases the cost of the foodstuff holder 100
23 may be of relatively high cost as compared to the foodstuff

1 101, it may be desirable to make the holder reusable so that
2 the foodstuff may be replaced once the original is consumed.
3 Any of several means may be employed to temporarily but
4 securely hold the foodstuff 101 in place in the holder 100.

5 In the case of candies as foodstuffs 101, it may be
6 desirable to have the socket/contact be designed such that any
7 of several "off the shelf" candies may be inserted into the
8 holding socket 140. This feature permits the user to readily
9 obtain refill foodstuff elements 101 at a variety of locations
10 and offers additional variety over a single, dedicated-
11 foodstuff design.

12 The instant invention therefore, teaches of a new and
13 highly interesting device which makes advantageous use of
14 optical, electrical or other physical conditions of a secured
15 foodstuff to control an incorporated action generating means.
16 Which means includes but are not limited to sound, light,
17 movement, vibration, electrical stimulation and odor
18 generation.

19 Although the invention has been described in terms of
20 specific embodiments, it will be readily apparent to those
21 skilled in this art that various modifications, rearrangements
22 and substitutions can be made without departing from the spirit
23 of the invention. It is understood that the means of producing

1 the instant invention include but are not limited to the
2 specific materials and embodiments described herein and that
3 other means exist to meet the requirements of such a system.
4 Such additional means are within the scope of this patent. The
5 scope of the invention is defined by the claims appended
6 hereto.

CLAIMS

What is claimed is:

1. A foodstuff holding device that produces sounds based upon interactions therewith, said holding device comprising: a rigid housing assembly having means for holding foodstuff; a foodstuff member removably secured to said rigid housing; output means for producing sound, said output means being supported by said housing assembly; a power supply for energizing said output means, said power supply being electrically coupled to said output means; and a control means for regulating said sound of said output means, said control means operatively joining said foodstuff with said output means; whereby said sound of said output means is governed by physical characteristics of said foodstuff wherein changes in said physical characteristics of said foodstuff produce corresponding changes in said sound.

2. The holding device of Claim 1, wherein: said foodstuff is electrically conductive; and said control means includes a first electrically conductive member electrically associated with said housing and a second electrically conductive member electrically associated with said foodstuff,

1 said first and second electrically conductive members adapted
2 to be electrically connected by body portions of an individual
3 that physically connect said first and second electrically
4 conductive members.

5
6 3. The holding device of Claim 1, wherein: said output
7 means includes a voltage-controlled oscillator; and said sound
8 includes at least one tone produced by said voltage-controlled
9 oscillator.

10
11 4. The holding device of Claim 1, wherein: said output
12 means includes a speaker and a storage member; and said sound
13 includes playback of at least one tone stored in said storage
14 member.

15
16 5. The holding device of Claim 4, wherein: said output
17 means further includes a distortion means for altering said
18 sound stored in said storage member.

19
20 6. The holding device of Claim 1, wherein: said output
21 means includes a microphone adapted to detect sounds; and said
22 sound includes broadcasting of at least one tone detected by
23 said microphone.

1
2 7. The holding device of Claim 6, wherein: said output
3 means further includes a distortion means for altering said
4 sound detected by said microphone.
5

6 8. The holding device of Claim 3, wherein: said output
7 means includes a microcontroller; and said sound includes
8 production of at least one query series of tones by said
9 voltage-controlled oscillator, said query series of tones
10 corresponding to a logarithm; monitoring an interaction between
11 an individual and said foodstuff; comparing said interaction
12 with an expected response; determining validity of said
13 interaction; and producing at least one response tone according
14 to said validity of said interaction; said sound being directed
15 by said microcontroller.
16

17 9. The holding device of Claim 2, wherein: said sound
18 includes the production of a shocking sensation effective to
19 alter a taste of said foodstuff.
20

1 10. The holding device of Claim 1, wherein: said control
2 means regulates said sound based upon a capacitance of said
3 circuit assembly, said capacitance being a product of an
4 interaction between an individual and said foodstuff.

5
6 11. The holding device of Claim 10, wherein: said output
7 means includes a voltage-controlled oscillator; and said sound
8 includes at least one tone produced by said voltage-controlled
9 oscillator upon electric completion of said circuit assembly,
10 said at least one tone having a frequency proportional to said
11 capacitance.

12
13 12. The holding device of Claim 10, wherein: said output
14 means includes a voltage-controlled oscillator; and said sound
15 includes at least one tone produced by said voltage-controlled
16 oscillator upon electric completion of said circuit assembly,
17 said at least one tone having a volume proportional to said
18 capacitance.

19
20 13. The holding device of Claim 10, wherein: said output
21 means includes a voltage-controlled oscillator and a
22 microcontroller; and said sound includes production of at least
23 one series of tones by said voltage-controlled oscillator;

1 monitoring interaction between an individual and said
2 foodstuff; determining validity of said interaction; and
3 producing at least response tone according to said validity of
4 said interaction; said sound being initiated upon electric
5 completion of said circuit assembly and being directed by said
6 microcontroller.

7
8 14. The holding device of Claim 1, wherein: said control
9 means regulates said sound based upon a conductivity of said
10 circuit assembly, said conductivity being a product of an
11 interaction between an individual and said foodstuff.

12
13 15. The holding device of Claim 14, wherein: said output
14 means includes a voltage-controlled oscillator; and said sound
15 includes at least one tone produced by said voltage-controlled
16 oscillator upon electric completion of said circuit assembly,
17 said at least one tone having a frequency proportional to said
18 conductivity.

19
20 16. The holding device of Claim 14, wherein: said output
21 means includes a voltage-controlled oscillator; and said sound
22 includes at least one tone produced by said voltage-controlled
23 oscillator upon electric completion of said circuit assembly,

1 said at least one tone having a volume proportional to said
2 conductivity.

3
4 17. The holding device of Claim 14, wherein: said output
5 means includes a voltage-controlled oscillator and a
6 microcontroller; and said sound includes production of at least
7 one series of tones by said voltage-controlled oscillator;
8 monitoring an interaction between an individual and said
9 foodstuff; determining validity of said interaction; and
10 producing at least response tone according to said validity of
11 said interaction; said sound being directed by said
12 microcontroller.

13
14 18. The holding device of Claim 1, wherein: said
15 foodstuff is optically conductive; and said control means
16 regulates said sound based upon an amount of light passing into
17 a light registering member through said foodstuff.

18
19 19. The holding device of Claim 18, wherein: said output
20 means includes a voltage-controlled oscillator; and said sound
21 includes at least one tone produced by said voltage-controlled
22 oscillator upon electric completion of said circuit assembly,

1 said at least one tone having a frequency proportional to said
2 amount of light.

3

4 20. The holding device of Claim 18, wherein: said output
5 means includes a voltage-controlled oscillator; and said sound
6 includes at least one tone produced by said voltage-controlled
7 oscillator upon electric completion of said circuit assembly,
8 said at least one tone having a volume proportional to said
9 amount of light.

10

11

12

Abstract

A method of controlling sound, light, motion or other action generating means by the control and/or manipulation of the electrical, optical or physical conditions of or proximal to foodstuffs is described.

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Fig. 1

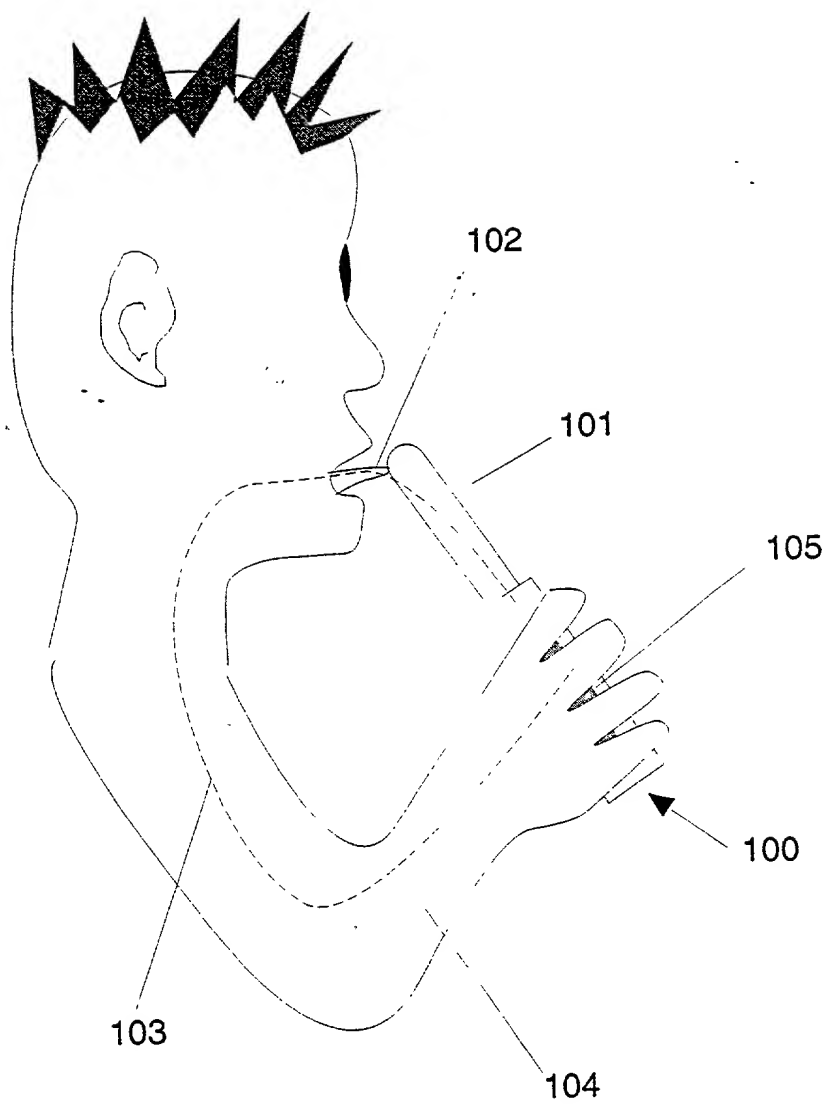


Fig. 1 is a perspective view of a device 100. The device includes a rectangular frame 101. A vertical rod 106 is positioned above the frame, with its lower end resting on a horizontal plate 105 that is part of the frame structure. The frame 101 has a central oval-shaped opening.

10.

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Fig. 3

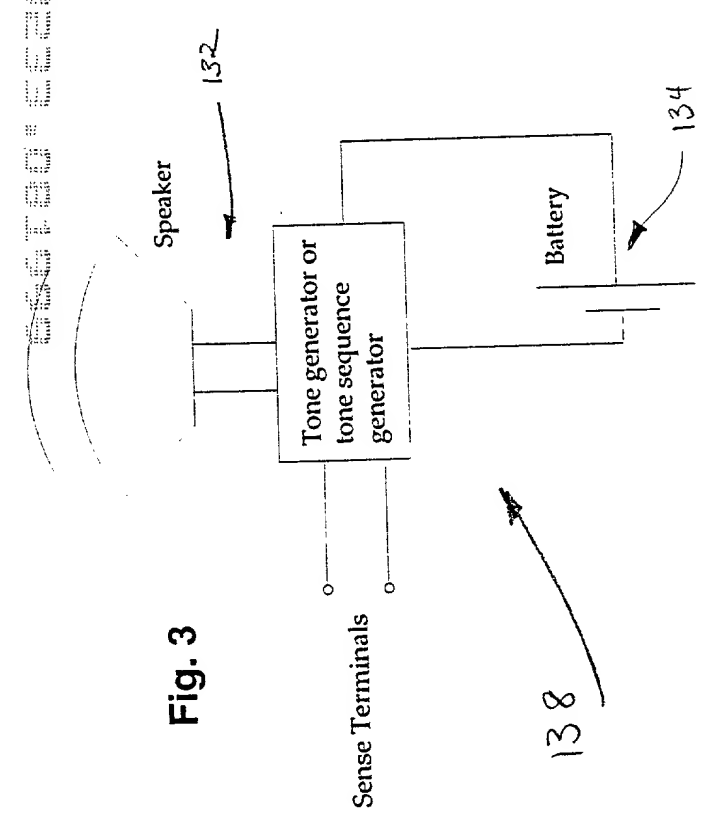


Fig. 4

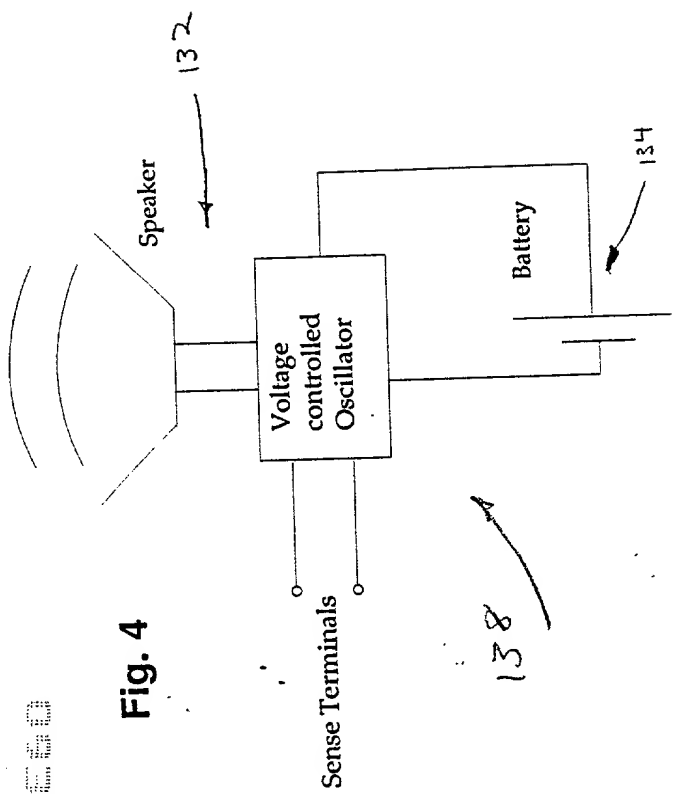


Fig. 5

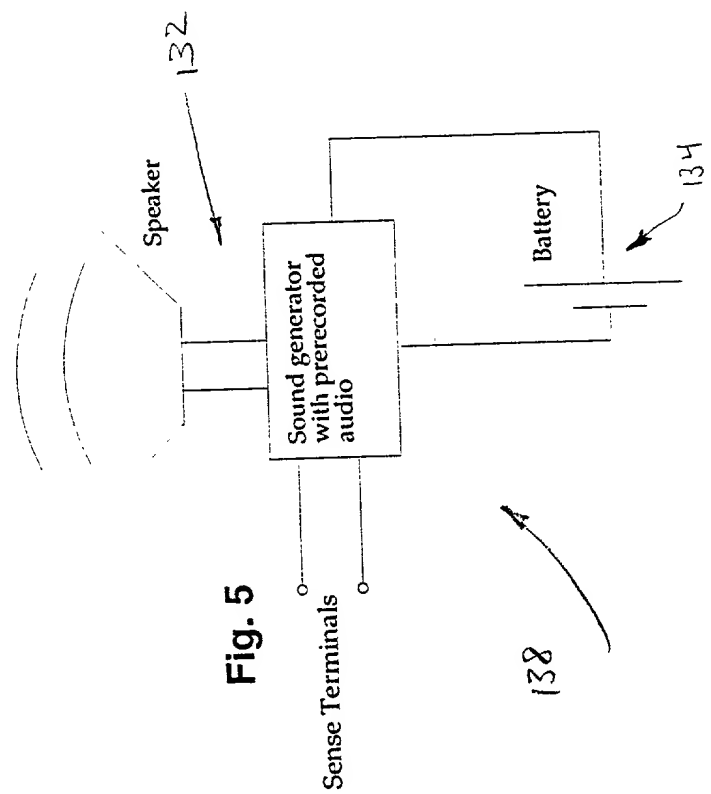


Fig. 6

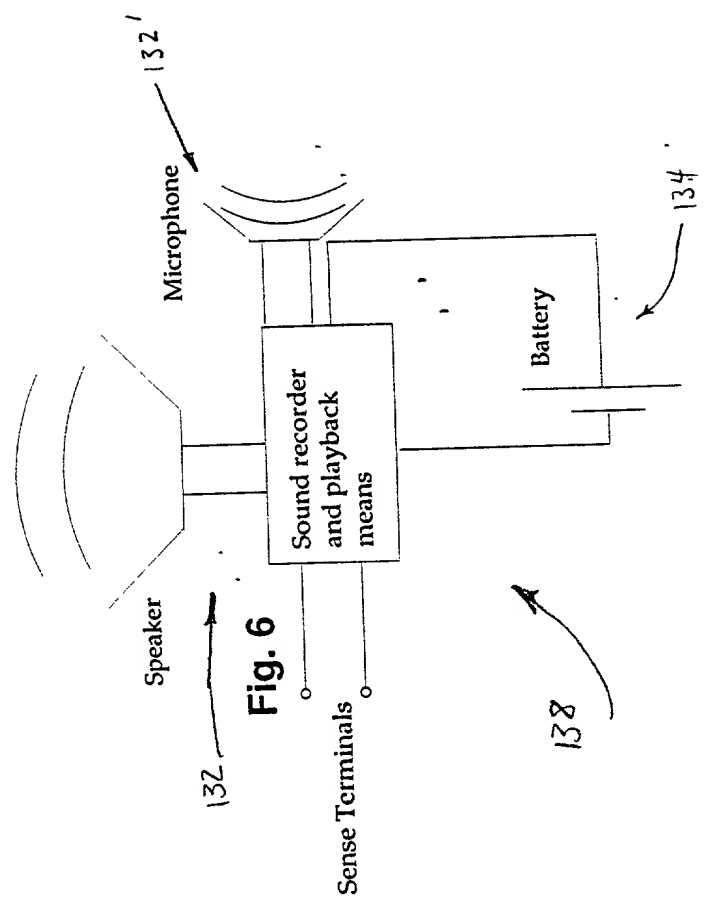
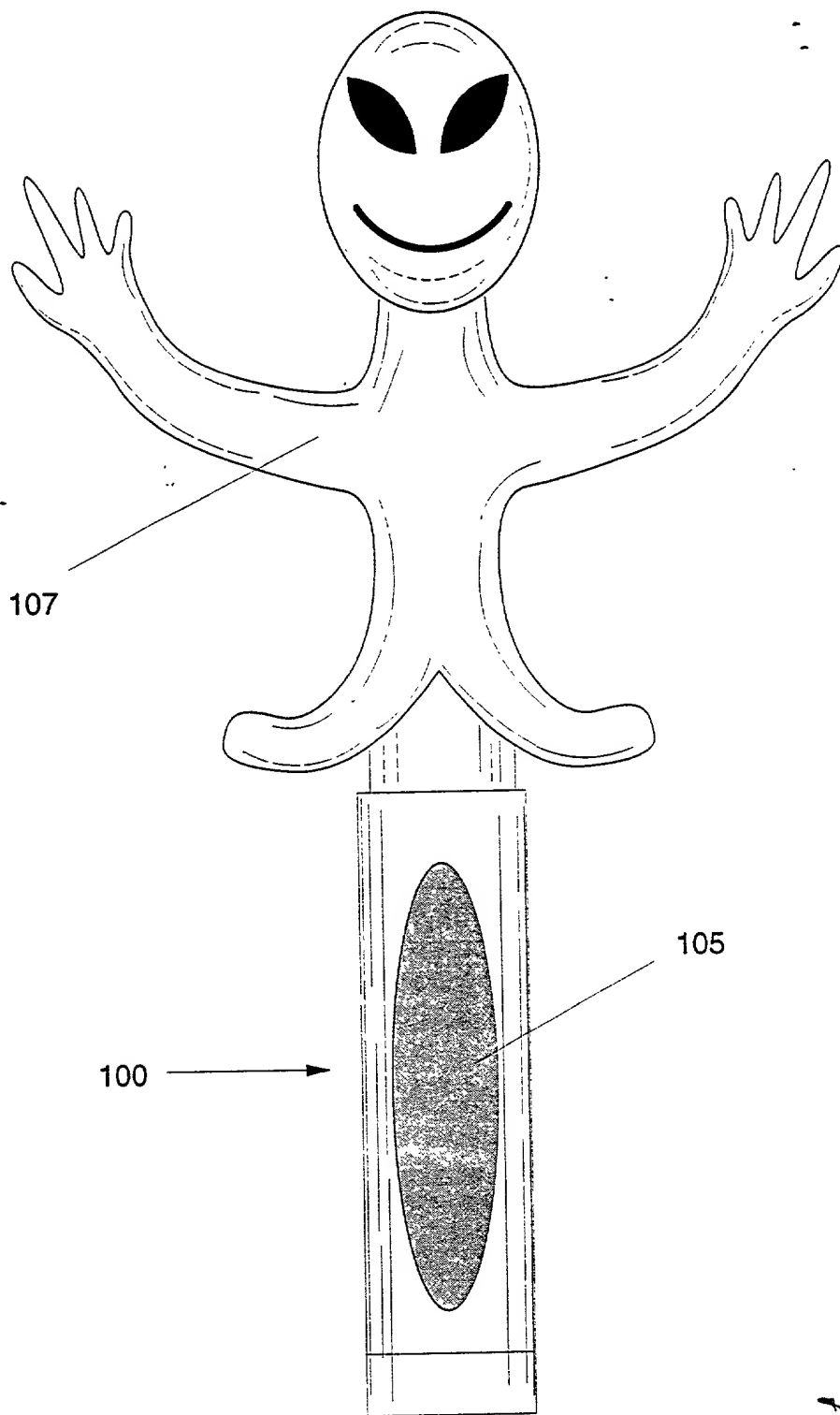


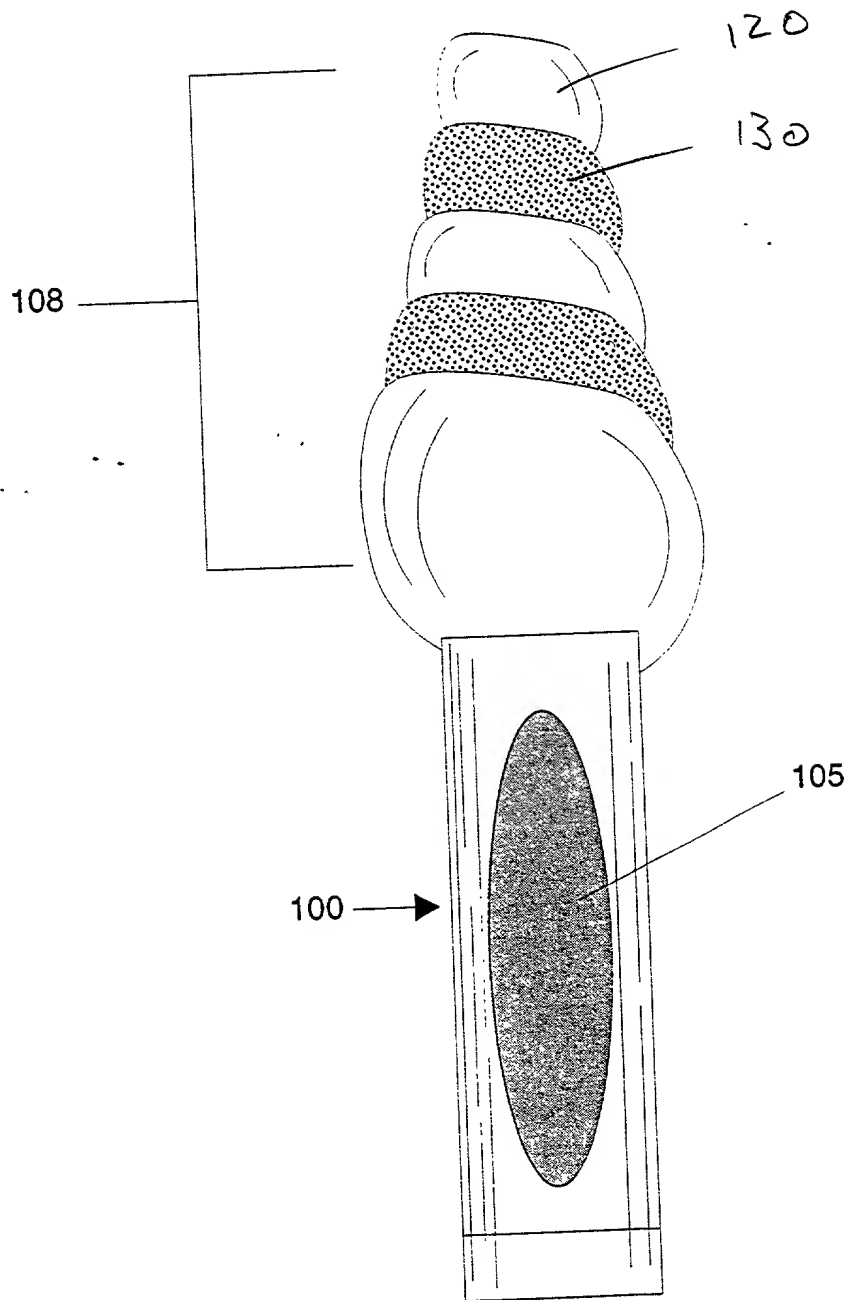
Fig. 7



10)

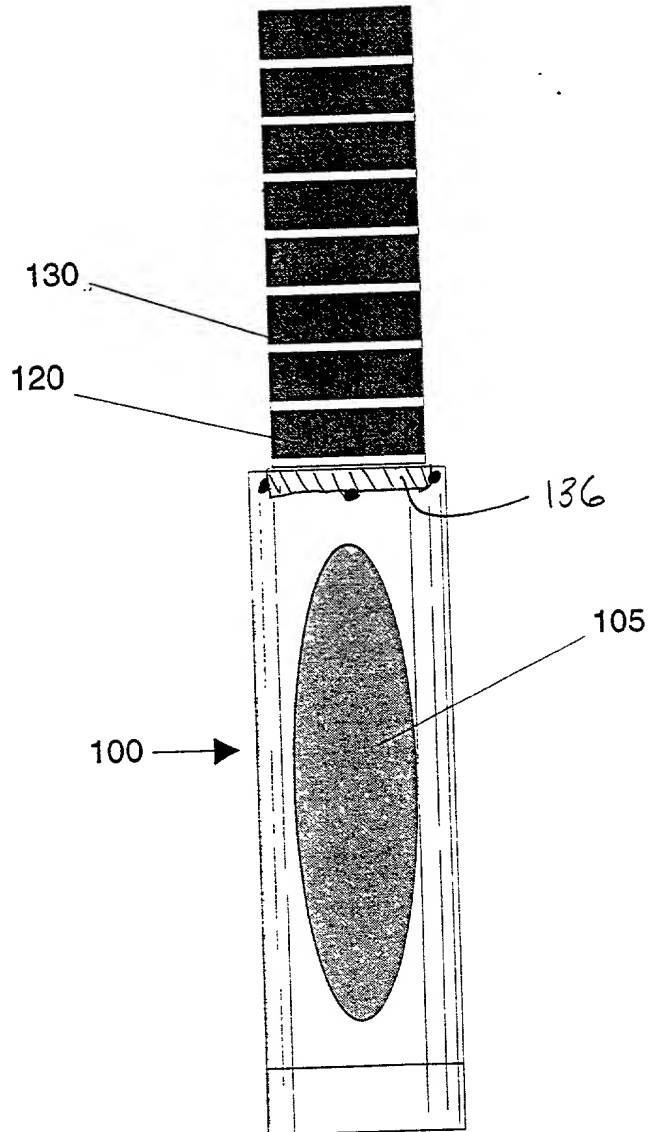
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Fig. 8



10

Fig. 9



10

Fig. 10

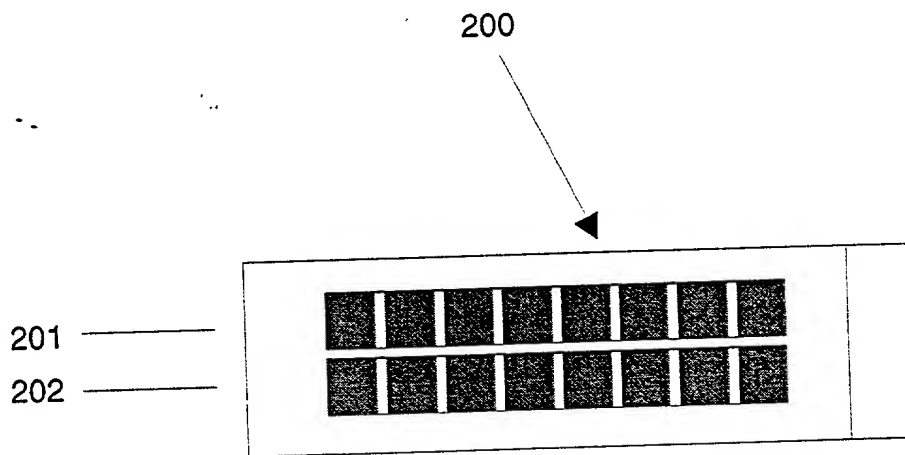
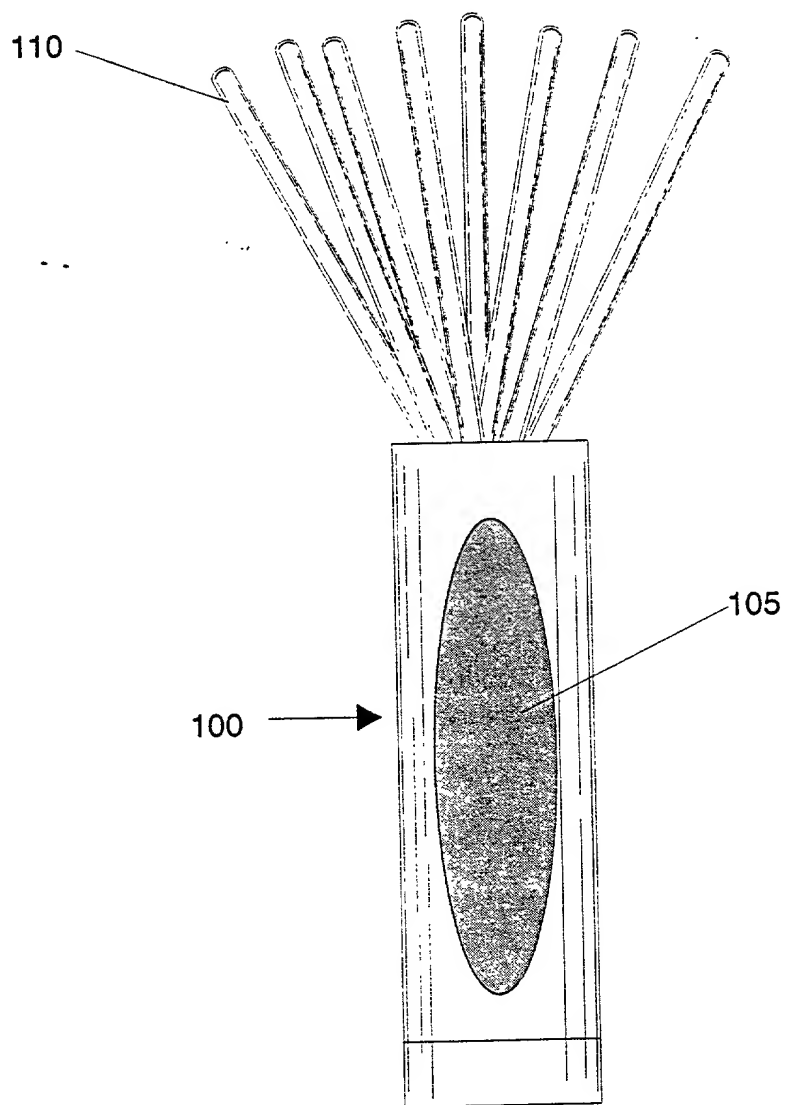
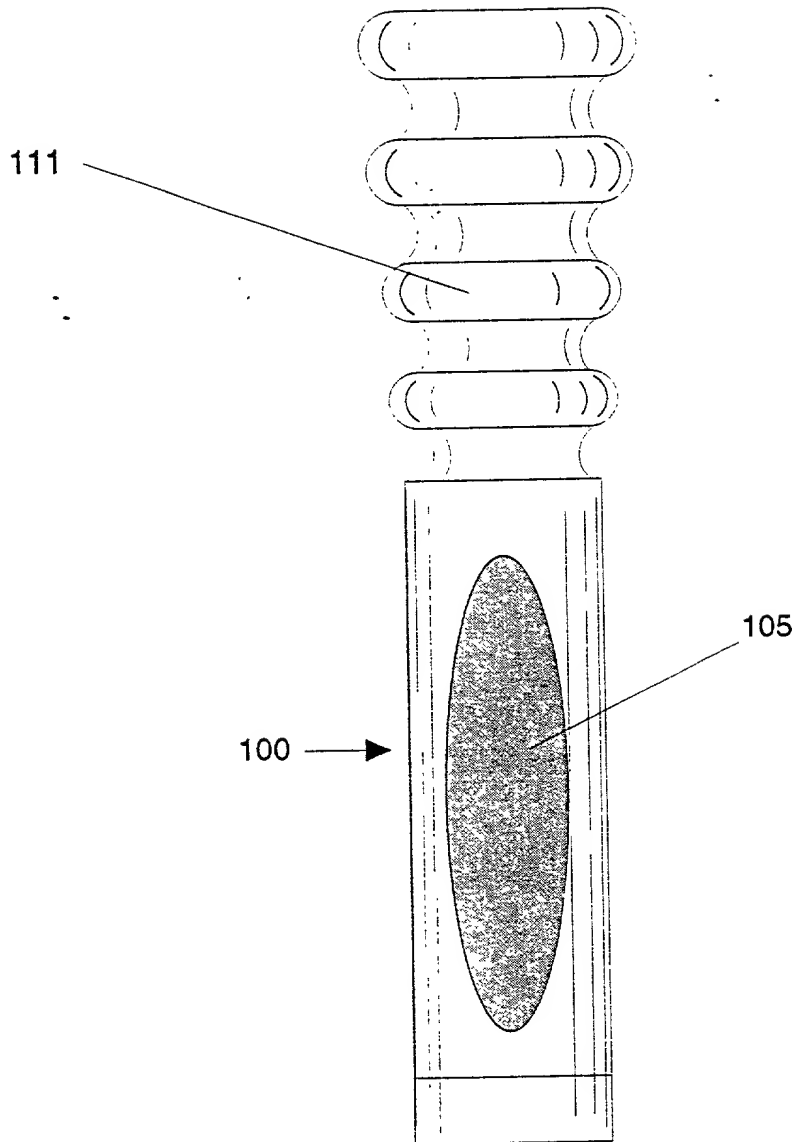


Fig. 11



10

Fig. 12



10

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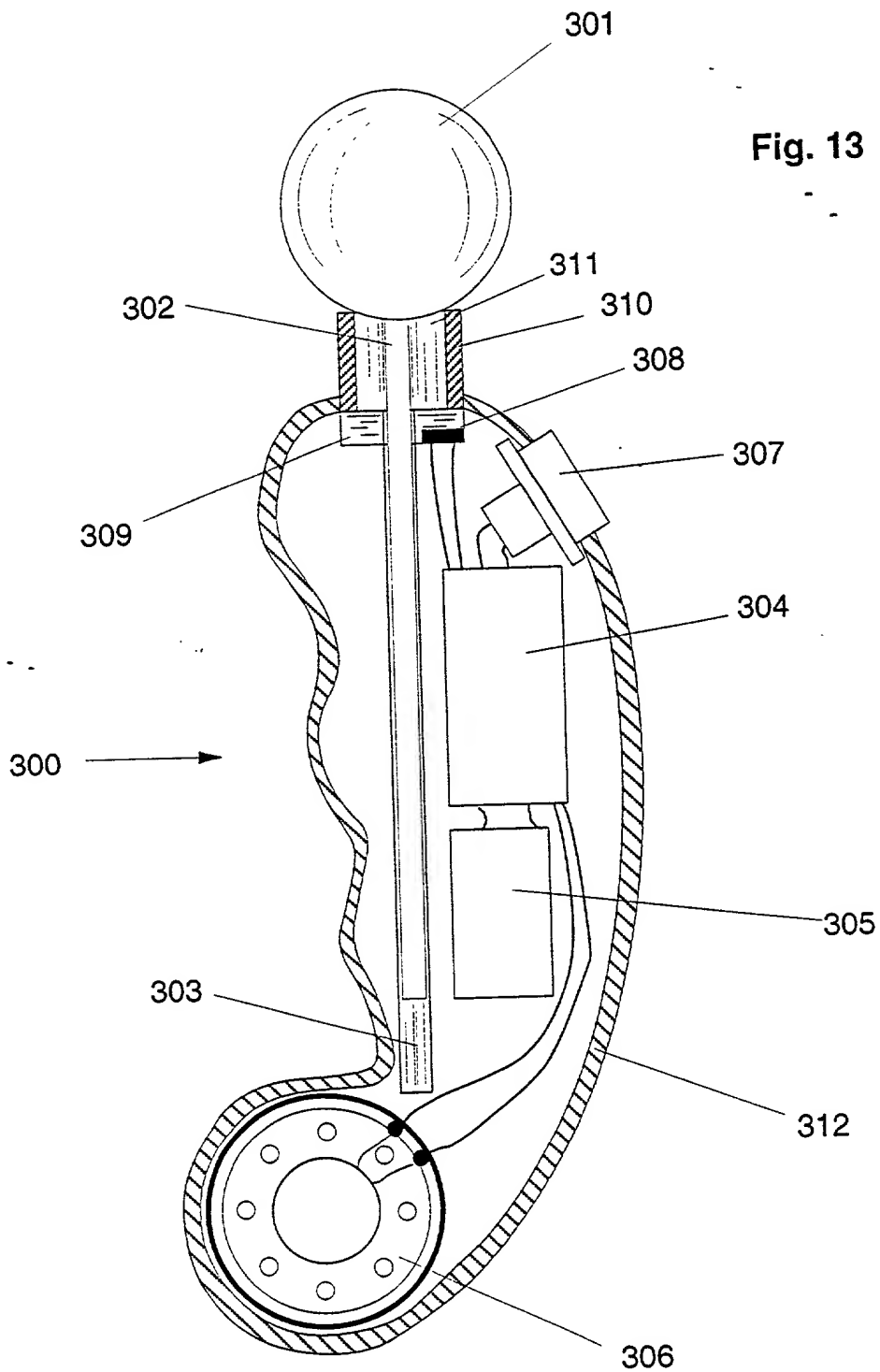
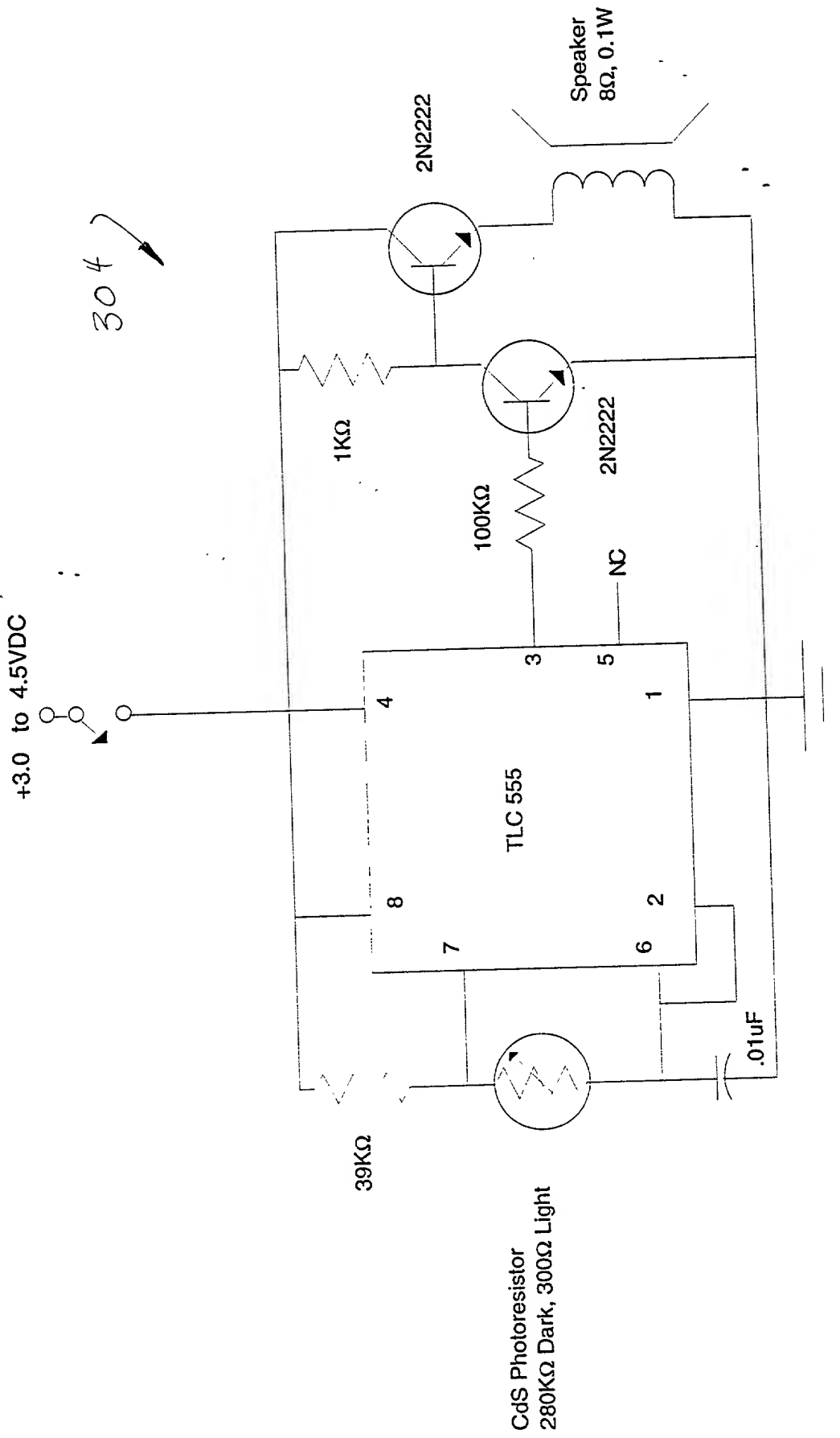


FIG. 14



666780 Fig.15

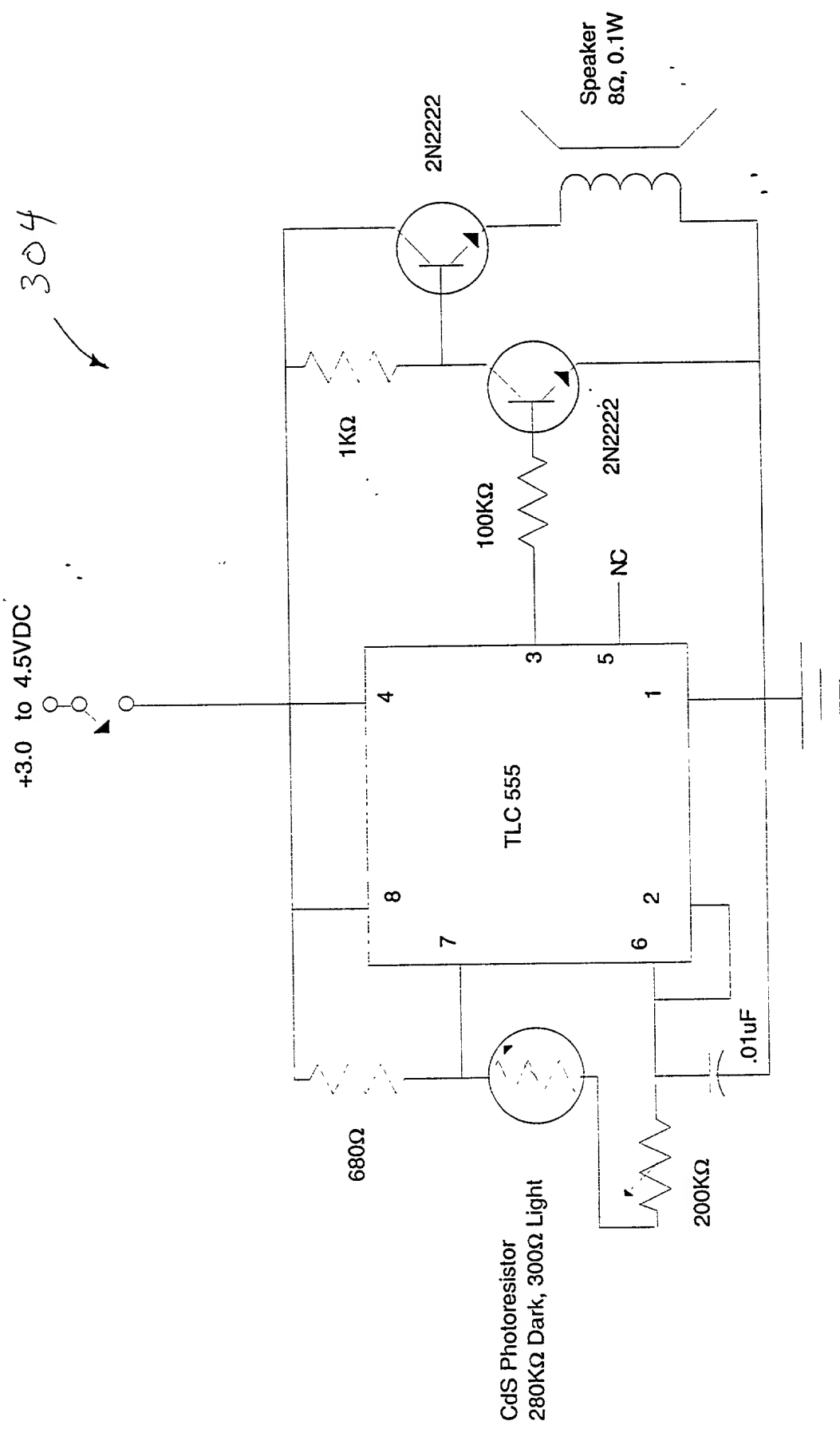


Fig. 16



TABLE 1

66700 66260

Table of measured resistance values for selected edible foodstuffs

All measurements made at approximately 72°F. with Omega HHM25 digital multimeter. Probes and leads were as supplied with meter. Except as noted, meter probes were placed flat against surface of foodstuff and were 1" apart as measured in the longitudinal direction of the candy. Both probes were pressed firmly against the foodstuff surface. Foodstuff elements were wetted on the surface by repeated licking.

Foodstuff Description	Product Name / Manufacturer	UPC code	Measured ohms		Measured ohms	
			per linear inch, Dry	per linear inch, Wet	per linear inch, Dry	per linear inch, Wet
Soft Black Licorice	Licorice Vines®/American Licorice	41364-0027	14 MΩ			0.6MΩ
Soft Sour apple Taffy	Laffy Taffy™/Sunmark	284740	30MΩ			4MΩ
Very soft Gelatin Worms	Gummi Worms/Favorite Brands	75602-07131	4MΩ			2.5MΩ
Pressed powder disk	Giant Tarts®/Sunline Brands	791672	>40MΩ			0.6MΩ
Hard lolly pop	Banana Split Astro Pop®	30800-00845	>40MΩ			40MΩ
Soft Fudge Candy	Tootsie Roll®/Tootsie Roll Ind.	71720-00933	4.5MΩ			4MΩ
Hard lolly pop	Jumbo Push Pop®/The Topps Co.	41116-00577	>40MΩ			40MΩ
Soft Taffy	Tangy Taffy®, Straw/Van/ Sunline Brands	79200-14136	>40MΩ			2MΩ
Med. Soft Bubble Gum	The Yardstick™ Bubble Gum/Foreign. Candy Co.	41168-00640	>40MΩ			1MΩ (see note 1)
Hard candy stick	Chick-o-Stick®	14200-53210	>40MΩ			no data
Caramel	Sugar Daddy®	71720-00933	12MΩ (see note 2)			10MΩ
Soft Fudge Candy	Tootsie Roll®					no data

Note 1: Bubble gum chewed for approximately 2 minutes prior to this measurement.

Note 2: 3/4" long Resistance meter probes pushed fully into opposite ends of candy

**DECLARATION FOR UTILITY OR DESIGN
PATENT APPLICATION (37 CFR 1.63)**

Attorney Docket No.: 2068.001
Inventor Name: William R. Palmer
and Stephen L. Palmer
Application No: /
Filing Date:
Group Art Unit:
Examiner Name:

☒ Decl. Sub.
w/Initial
Filing

☐ Decl. Sub.
after Initial
Filing (surcharge
(37 CFR 1.15 (e))

As a below named inventor, I hereby declare that:

My residence, post office addr., and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

INTERACTIVE FOODSTUFF HOLDING DEVICE

the specification which

☒ is attached hereto OR

☐ was filed on _____ As United States Application No. or PCT Intl. Appln. No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN NUMBERS:	COUNTRY:	FOREIGN FILING DATE:	PRIORITY NOT CLAIMED:	CERTIFIED COPY	
				Yes	No

Additional foreign appln. nos. are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below:

APPLICATION NUMBER(s): _____ **FILING DATE:** _____

60/097,421

08/20/98

DECLARATION - UTILITY or DESIGN PATENT APPLICATION

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

U.S. PATENT APPLICATION
or PCT NUMBER:

PARENT FILING DATE:

PARENT PATENT NO:
(if applicable)

Additional U.S. or PCT international appln.nos. are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: X Customer No: 21917 PLACE CUSTOMER No.

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NAME:	REGISTRATION NO:	NAME:	REGISTRATION NO:
Michael A. Slavin	34,016	Erik C. Swanson	40,194
Ferris H. Lander	43,377		

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NAME:	McHale & Slavin, P.A.		
ADDRESS:	4440 PGA Blvd.,		
ADDRESS:	Suite 402		
CITY:	Palm Beach Gardens	STATE:	FL
		ZIP:	33410
COUNTRY:	U.S.	TELEPHONE:	(561) 625-6575
		FAX:	(561) 625-6572

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 17 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR: A Petition has been filed for this unsigned inv.
GIVEN NAME (first and middle [if any]): _____ FAMILY NAME OR SURNAME: _____

William Randall	Palmer
Inventor's signature: <u>William Randall Palmer</u>	Date: <u>08/16/99</u>
Residence: City: <u>2510 Knollwood Dr., Cameron Park, CA 95682</u>	
Post Office Address: <u>2510 Knollwood Dr., Cameron Park, CA 95682</u>	
Post Office Address: <u>2510 Knollwood Dr.</u>	
City: <u>Cameron Park, CA</u>	Zip: <u>95682</u> Country: <u>U.S.A.</u>

Additional inventors are being named on the X Supplemental additional inventor(s) sheet(s) PTO/SB/02A attached hereto. Page 2 of 3

NAME OF SECOND INVENTOR: A Petition has been filed for this unsigned inv.
 GIVEN NAME (first and middle [if any]): _____ FAMILY NAME OR SURNAME: _____
Stephen Lynn Palmer
 Inventor's signature: *SL Palmer* Date: 8-18-99
 Residence: City: 4391 Cameron Rd., Cameron Park, CA 95682
 Post Office Address: 4391 Cameron Rd., Cameron Park, CA 95682
 Post Office Address: 4391 Cameron Rd., Cameron Park, CA 95682
 City: Cameron Park, CA Zip: 95682 Country: U.S.A.